UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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3737	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2008*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-11,13-17 and 19* is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-11,13-17 and 19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All   b)☐ Some *   c)☐ None of:

       1.☐ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____ .

DETAILED ACTION

Allowable Subject Matter

The indicated allowability of claims 2, 10 and 18 is withdrawn in view of further consideration to the prior art of record. Such reconsideration is described below in "Response to Arguments."

Response to Arguments

Kanebako et al. describes the claimed subject matter of originally filed claims 2, 10 and 18 in the methods of the invention, which are now incorporated into the independent claims. The image processor of Kanebako teaches thresholding and outline, or edge detection. This process is repeated when more profiles exist, thereby growing the region. Column 11, line 65 through column 12, line 22 teaches that the thresholding technique is used to determine an outline point. Furthermore, the threshold value is able to be arbitrarily changed by the user, thereby providing ability to edit the volumes (column 11, lines 4-10). Also, the ejection fraction can be measured based on the diastolic and systolic volumes (column 9, lines 58-66).

With regard to original claim 2 (now integrated into independent claim 1), in Sheehan, once an image along one of the planes scanned is visually represented on the display, the user may use various inputs to create, or edit, the contour. Based on this information, the volume and ejection fraction may later be determined as described in Figure 16.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1, 4-11 and 19 are rejected under 35 U.S.C. 101 because the claimed

invention is directed to non-statutory subject matter. The claims are directed towards

data processing and computer program per se which does not constitute a statutory

process, machine, manufacture, or composition of matter. Furthermore, the claims fail

to tie the process to another statutory class or identify an apparatus that accomplishes

the method steps.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

Claims 1, 4-8, 10-11, 13-17 and 19 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Kanebako et al. (US Patent No. 5,680,471) in view of Devito et al.

(US Patent No. 5,421,331). Kanebako discloses an image processor that acquires an

image including a desired portion of an object to be examined. An image memory

temporarily stores the acquired image, and an outline is extracted from an area of

interest from the desired portion of the object (see Abstract). Kanebako contemplates

X-ray imaging being the image processing method, wherein a left ventricle outline

extraction method is available (column 1, lines 15-32). However, other imaging

modalities may be used for such methods, as described at column 8, lines 60-67. In

one embodiment, a profile synthesizing section selects an image at the end of diastole

from the image memory. The operator then selects, thereby verifying, the image while

watching images displayed on an image display section. Subsequently, the profile

synthesizing section loads an end diastole image one frame ahead of the selected

image into the second image memory. Processing is then performed on these images

as further described in column 20, lines 54-67 and into column 21. The image

processor of Kanebako teaches thresholding and outline, or edge detection. This

process is repeated when more profiles exist, thereby growing the region. Column 11,

line 65 through column 12, line 22 teaches that the thresholding technique is used to

determine an outline point. Furthermore, the threshold value is able to be arbitrarily

changed by the user, thereby providing ability to edit the volumes (column 11, lines 4-10). Also, the ejection fraction can be measured based on the diastolic and systolic volumes (column 9, lines 58-66). However, as can be seen in Figure 2, before this selection process can take place the long axis must be set and a long axis perpendicular profile must be generated. Kanebako does not describe automatic determination of the long axis. Devito teaches a method for automatically identifying the long axis of the left ventricle. A first estimate of the long axis is created and is then fine tuned through the process described at column 4, line 48 through column 6, line 22. While never explicitly stating that Devito is determining the axis of inertia, as defined in the specification of the current application the axis of inertia is a first estimate of the long axis. Therefore, Devito teaches this limitation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate an automated long axis detection process into the system and methods of Kanebako to increase the utility of such a device and allow better results during cardiac studies (column 1, lines 44-46 of Devito).

It is noted that the portion of Kanebako where the selection of the end diastole is mentioned is only described by Kanebako as an example and is entirely capable, and intended to, acquire other phases of the heart cycle, including the end systole. This is suggested at column 9, line 61 through column 10, line 3, where Kanebako states that ejection fraction and cardiac wall motion analysis are obtained on the basis of the outline shapes determined at *both* the end diastole and end systole phases.

Claims 1 and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Sheehan et al. (US Patent No. 5,435,310) in view of Devito et al. Sheehan

discloses a method for imaging and three-dimensional modeling portions of the heart, in

particularly, the left ventricular endocardial and epicardial surfaces, using image data.

Images are acquired via ultrasound or magnetic resonance and provide multiple plane

imaging data at end systole and end diastole during a cardiac cycle (*see* Abstract). A

magnetic resonance system provides image data for at least eight planes that are

transverse to the longitudinal axis, i.e., parallel to the transverse axis of the left ventricle

(column 6, lines 61-68). Also see column 11, lines 614-68. Both manual and automatic

edge detection is contemplated at column 7, lines 20-33 and lines 58-61, respectively.

During at least one cardiac cycle, an end diastole and an end systole will be selected for

each of the image planes. In order to determine which image planes are scanned at a

particular time during the cardiac cycle, an ECG will be recorded during the imaging

process (column 7, lines 42-48). Once an image along one of the planes scanned is

visually represented on the display, the user may use various inputs to create, or edit,

the contour. Based on this information, the volume and ejection fraction may later be

determined as described in Figure 16. By dynamically viewing different cross sections

of the left ventricle from different points of view, a medical practitioner can monitor

dynamic changes in cardiac function with respect to wall thickness and range of motion

of the cardiac wall (column 10, lines 58-62 of Sheehan). However, other cardiac

studies, such as perfusion studies, reference the position of the tissue region to the long

axis of the left ventricle. Such a reference is inherently subjective because identification

of the long axis of the patient's left ventricle requires a technician to use judgment

(column 1, lines 36-42 of Devito). Devito teaches a method for automatically identifying

the long axis of the left ventricle. A first estimate of the long axis is created and is then

fine tuned through the process described at column 4, line 48 through column 6, line 22.

While never explicitly stating that Devito is determining the axis of inertia, as defined in

the specification of the current application the axis of inertia is a first estimate of the long

axis. Therefore, Devito teaches this limitation. It would have been obvious to one

having ordinary skill in the art at the time the invention was made to incorporate an

automated long axis detection process into the system and methods of Sheehan to

increase the utility of such a device and to allow better results during cardiac studies

(column 1, lines 44-46 of Devito).

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to JAMES KISH whose telephone number is (571)272-

5554. The examiner can normally be reached on 8:30 - 5:00 ~ Mon. - Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ruth S. Smith/
Primary Examiner, Art Unit 3737

JMK